

SOLAR ELECTRIC SITE ASSESSMENT REPORT

Solomon Juneau Business High School
Solar Electric Site Assessment
6415 W. Mount Vernon Avenue
Joseph Gorecki, PE, LEED AP
414-283-4716



Site Assessor
Ryan Lettau



W231 N2844 Round Circle East
Pewaukee, WI 53072

Date of Site Visit: May 8, 2009

Date Final Report completed: May 18, 2009

THIS SITE ASSESSMENT WAS CO FUNDED BY FOCUS ON ENERGY
(FOCUSONENERGY.COM OR 800 762.7077)

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EXECUTIVE SUMMARY

Solomon Juneau Business High School is located in Milwaukee, Wisconsin, which is within the WE Energies service territory. The school has a couple of potential roofs to locate a solar electric (PV) system on, but the one roof that stands out as the best is the swimming pool roof which is located at the far south end of the building.

The swimming pool roof is approximately 7,630 square feet, with no obstructions (only 2 drains and 6 small roof vents). The roof itself is fairly new and is in good condition. I expect the roof system to last another 15-25 years if maintained properly. Shading is limited to the early morning hours in the winter months; the average annual shading is estimated at 1.0%.

Based on the above properties of this site, I would recommend installing a 20-28 kW system as budget allows. Once all currently available grants are accounted for, a system on this roof should reach a cost recovery at approximately 15 years.

Energy Production, Cost, Economics and Environment	
Production	
Solar electric systems rated module capacity (kW dc)	28.00
Estimated output year one (kWh/yr)	33,614
Cost	
Estimated installed cost	\$252,000
Focus Incentive	\$50,000
WE Grant and Expected Production Buydown	\$125,211
System cost after first cost incentives	\$76,790
System Cost after all incentives	\$76,790
Value of year 1 to year 10 power production	\$49,361
Economics	
10 year discounted NPV	-\$42,393
25 Year discounted NPV	\$44,402
10 Year IRR	-8.9%
25 Year IRR	6.4%
Years to cost recovery	15.0
Environment	
CO2 emission reduction per year (tons/year)	37.2
Key Assumptions	
Cost of System Per kW (dc)	\$9,000
Electricity rate year one (\$/kWh)	\$0.11
Estimated electricity price inflation rate (%/yr)	7.00%
Expected output degradation (%/year)	0.50%
Discount rate (used only in NPV)	2.9%

NEXT STEPS

- A) Evaluate the options presented in this report, and make a decision on system size, location and mounting methods.
- B) Engineering reviews maybe needed.
- C) For roof mounted systems, confirm with the building designer and/or qualified structural engineer as to the building roof structure's ability to support the additional weight and wind loading of a solar electric system. Also, review the impact on roofing warrantee of siting panels over roofing.
- D) With an electrical professional, ensure space is available for balance of system components (e.g., inverter(s) disconnects, etc.) in the utility room, and at that space is available at electric panel/substation, with good access to the solar modules.
- E) Determine the project's economics with your financial professionals. Incentive programs are subject to change, so ensure you information is up to date. For information regarding:
- F) The We Energies renewable energy programs, contact: We Energies Customer Contact Center at 800-714-7777, ext. 7700 or www.we-energies.com/re
- G) Focus on Energy incentives, contact: www.focusonenergy.com or 800 762.7077.
- H) Federal tax incentives, contact: the IRS.
- I) U.S. Department of Agriculture rural business incentives, contact: www.farmenergy.org or in Wisconsin, Mark Brodziski at 715.345.7615, or mark.brodziski@wi.usda.gov
- J) Contact at least three qualified installers to get price quotes (see Focus on Energy's full service solar electric installers attached to this report for a directory of Wisconsin's solar electric installers).
- K) It is recommended that the installer completes interconnection applications, obtains permits and fills out Focus on Energy incentive paperwork.
- L) Ensure that price quotes are comparable (e.g., all include any work that may be needed on the AC side of the inverter to be eligible for We Energies or Madison Gas and Electric buy back rates incentives).
- M) Contact your insurance agent and advise them of your intent to install the renewable energy system, and ask for written confirmation of the liability coverage currently provided (as needed to meet utility requirements). Confirm that current insurance provides the needed coverage, and resolve any issues with the agent.
- N) Define any permitting requirements for the installation of the system.
- O) Based on the quote received, and consultation with financial professionals, make the final decisions on the project's size, location, mounting options and price with your preferred installer.
- P) Apply and receive approval for incentives as appropriate. Commonly your preferred installer will assist with the applications.
- Q) Sign the installation contract with your selected installation firm.
- R) Insure that all zoning, utility agreements, financial incentive and any other required approvals are in hand prior to making any commitment to purchase.
- S) It is usually much more cost effective to make energy efficiency improvements than install a solar electric system. For information about the Focus on Energy business energy efficiency program contact: Focusonenergy.com or 800.762.7077

Disclaimers:

All costs, power production, economic and other values in this report are estimates. The economics analysis presented in this report should be considered one method of evaluating this project. The company must conduct their own economic evaluation with a financial professional. The estimated installed system cost(s) are/is not a formal estimate or bid. The information provided in this report should NOT be considered legal, financial, or tax advice.

PURPOSE OF SITE ASSESSMENT

The purpose of this assessment is to provide site-specific information on how a solar electric (also referred to as a photovoltaic, or PV) system would perform at your location, including information on estimated physical size, rated output, energy production, costs, financial incentives and mounting options. Site assessors are required to present unbiased information and may not recommend contractors or products.

Customer Motivation

The site owner is interested in:

- Clean energy/environmental concerns
- Reducing energy bills: maximizing system production and minimizing cost
- Educational/Demonstration project: system should be accessible, visible and may include data monitoring systems
- Public relations: system should be visible and attractive if possible

Customers Solar electric System Size Expectations: 10 to 30 kW¹

¹ In Wisconsin, a one kilowatt (kW) solar electric system, that is unshaded and fix mounted, will generate about 1200 kilowatt hours (kWh) per year. A one kW unshaded dual axis tracking system will generate about 1600 kWh/year.

ROOF ASSESSMENT

Roof Description

The roof with the most potential for a photovoltaic system is the swimming pool roof located on the far south end of the building. This roof is a gravel surfaced built-up roof system. The perimeter of the roof is comprised of a 30" masonry parapet wall with reglet-cut metal counterflashing. The parapet wall has a metal coping.

Roof Condition

The swimming pool roof is in good condition. This roof appears to be 5-10 years old and should have another 15-25 years of service life if properly maintained.

Roof Area

The swimming pool roof is approximately 7,560 square feet (70'x109')

Supporting Structure

The structural support of the roof is comprised of steel beams and metal and concrete deck. It was hard to determine the sizes of the supporting structure or the existence of concrete deck due to a fire proofing material on the underside of the roof. The assumption of the concrete deck was based on the age of type of structure.

Aerial Photo



(Swimming Pool Roof to the far right of Photo)

Roof Drawings

See attachments

Photos



Photo #1: Roof Overview (Looking South)

SITE ASSESSMENT

Shading Estimate



Photo #2: Solar Pathfinder

Location #1		Location #1	
Month	Shading (%)	Month	Production (kWh)
January	4	January	73.9
February	1	February	83.2
March	0	March	102.0
April	0	April	118.0
May	0	May	135.0
June	0	June	135.0
July	0	July	131.0
August	0	August	127.0
September	0	September	111.0
October	1	October	93.1
November	3	November	61.1
December	4	December	53.8
Avg. Shading	1.08	Annual Prod.	1224

[Production Estimates are based on a 1 kW system]

Balance of System

As mentioned previously, the power produced by the PV panels is DC power and must be converted to AC power by an inverter. The Balance of System (BOS) includes this inverter and other electronic components, e.g. a disconnect, a meter, etc. The wires from the panels are combined into one set of wires which must then be run from the PV panels to the location of the BOS. At this site, the balance of the system would take place in the mechanical room directly to the north of the swimming pool roof (as far north as the chimney). The mechanical room is quite large, so selecting a location for the inverter and other BOS components should not be an issue.

The photo below is of the west wall of the mechanical room. This wall hosts three 225 amp, 120/240 volt circuit breakers. The remaining portion of the mechanical room is fairly open, with some mechanical equipment dispersed throughout.



Photo #3: West wall of mechanical room

SIZING AND LAYOUT RECOMMENDATIONS

Based on Roof & Shading

The roof is approximately 7,630 SF and could hold up to 35 kW of tightly aligned panels.

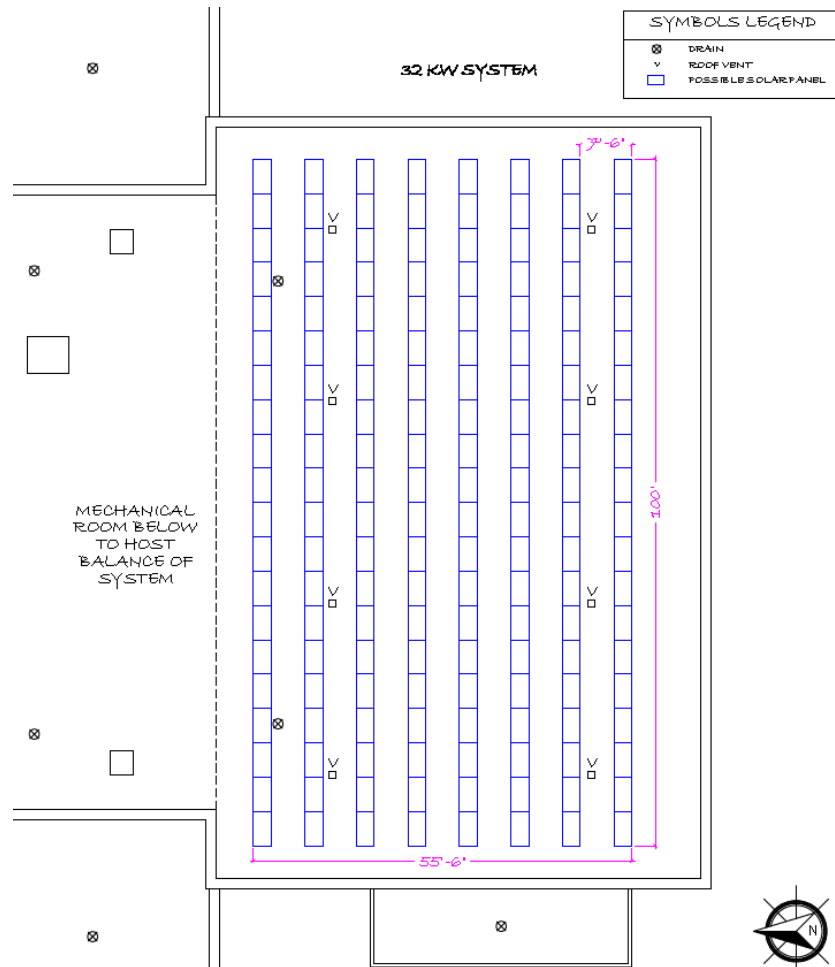
Based on a Financial Basis

The customer did not define a specific budget for this project.

Based on Building's Energy Consumption

Annual Building Consumption	233,880	kWh
% of Energy	System Size	
100%	194.9	kW
75%	146.2	kW
50%	97.5	kW
25%	48.7	kW

Proposed Drawing/Layout



Mounting Options

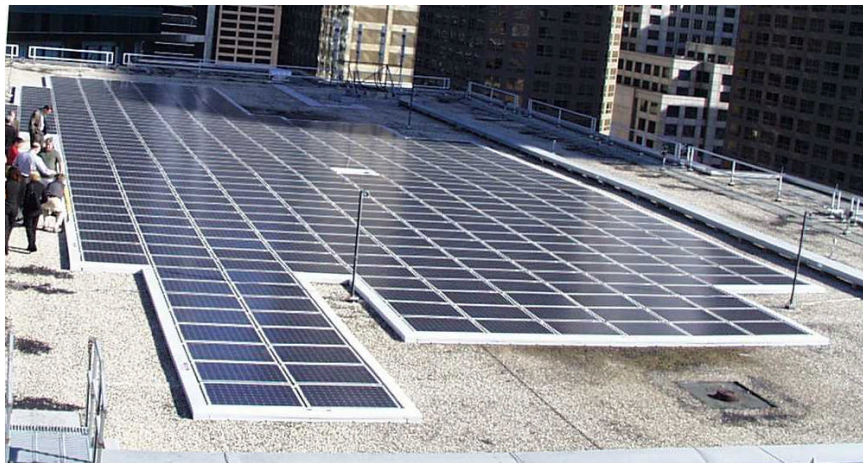
For all roof-mounted systems, the roof loading from the modules, racks, balance of system, etc., as well as wind and snow loading, must be evaluated to determine if the roof is structurally able to support the additional loads. This is the responsibility of the customer and their structural engineer. For ground mounted systems, analysis is required but not required.

Ballasted Rack System



Photograph Example of flat roof ballasted (weighted) racking system. Note the roofing stone filled pans hold the racks and modules to the roof. Other types of ballast may be used in the pans. These systems are typically tilt the modules at 20 to 30 degrees. When un-shaded this type of system would be expected to generate about 1200 kWh/year per kilowatt (kW) of modules. Fix mounted systems have no moving parts and are therefore expected to require very little maintenance. (Photograph Niels Wolter, Focus on Energy)

Flat-Roof horizontal Mounted



Photograph _ Example of a flat-roof horizontal mounted solar electric system. This system will not shed snow in the winter and may spend one to two months snow covered and not generating any power. Also in urban and dusty areas grime will tend to build up on these systems, resulting in reduced annual power production. However systems costs should be lower than other roof mounted options. The system may also increase roof membrane life, increase the roofs R-value and will have less roof loading than ballasted racks. When un-shaded this type of system would be expected to generate roughly 900 kWh/year per kilowatt (kW) of modules. Fix mounted

systems have no moving parts and are therefore expected to require very little maintenance. (Photograph, Gary Nowakowski U.S. DOE)

Standing Seam Metal Roof Mounted



Photograph Example of a standing metal seam roof mounted solar electric system. When unshaded this type of system would be expected to generate about 1200 kWh/year per kilowatt (kW) of modules. Fix mounted systems have no moving parts and are therefore expected to require very little maintenance. (Photograph H&H Electric)

Pole Mounted System



Photograph example of a top of pole mounted system. These systems can be either fixed or tracking. A tracking system is typically more expensive, but will collect more of the sun's rays throughout the day. When unshaded this type of system would be expected to generate between 1200 kWh/year per kilowatt (kW) of modules for a fixed mounted system and 1500 kWh/year per kilowatt (kW) of modules for a two axis tracking system.

SITE'S ELECTRIC DATA

Electrical Service: The electrical service is single phase, 225 Amp, 120/240 volt service. As stated above, this is not the main electrical service room, but a mechanical room.

Average Annual Energy Usage (kWh/month): Data as provided by customer

Month	Energy Consumption
	Total (kWh)
April 2008	12,840
May 2008	10,680
June 2008	11,400
July 2008	11,440
August 2008	10,520
September 2008	9,920
October 2008	14,800
November 2008	23,560
December 2008	33,080
January 2009	29,680
February 2009	30,760
March 2009	35,200
Total	233,880
Monthly Avg	19,490

Site's Electric Utility: WE Energies
Total Annual Electricity Bill (\$): \$25,493
Utility Rate Name: 66-CG-2 General Secondary Demand Electrical Service
Rate (\$/kWh): \$0.109 (past 12 month average)
Monthly Demand Rate (\$/kW) \$5.60/kW

SOLAR INCENTIVES

Focus on Energy Incentives

Cash Back Rewards for systems rated 20 kW or less

- Based on systems expected annual production in kWhs multiplied by \$1.50/kWh (\$2.00/kWh for non-profits and local governments)
- Reward will not pay for more than 25% of system's installed cost (35% for non-profits)
- Reward may not exceed \$35,000
- Reward is considered taxable income for businesses

Implementation Grants for systems rated from 20 kW to 50 kW

- Based on systems expected annual production in kWhs multiplied by \$1.00/kWh (\$1.50/kWh for non-profits and local governments)
- Grant will not pay for more than 25% of system's installed cost (35% for non-profits)
- Grant may not exceed \$50,000
- Grant is considered taxable income for businesses

We Energies Incentives

For detailed information contact We Energies,

- Phone 800 714.7777 ext. 7700
- Internet: www.we-energies.com/business_new/altenergy/renewable.htm

WE Energies Non Profit Direct Incentive

Summary information:

- Must be We Energies electricity customer
- Must be owned by a not-for-profit organization, not-for-profit educational/academic institution, unit of government, or special district or authority defined as government under Wisconsin law
- Grants of \$10,000 to \$100,000 available
- Incentive covers half of the costs remaining after Focus on Energy (and government incentives)
- Funds are limited and are competitively awarded

WE Energies Solar Electric Photovoltaic Expected Performance-Based Buy Down

- Must be We Energies electricity customer
- Upfront \$0.75/kWh for the first year's expected AC generation
- 1.5 kW-DC to 100 kW-DC system sizes

State of Wisconsin Incentives

State Taxes

Wisconsin's depreciation is based on the Federal depreciation formula. So the Federal five-year accelerated depreciation applies to Wisconsin business income taxes as well.

Property Tax Exemption

Solar electric systems are exempt from Wisconsin property taxes.

Net Energy Billing

Wisconsin municipal and investor-owned utilities are required to allow customers to net-meter systems with rated output of 20kW or less. What this means is that the utility will provide full retail credit for any extra energy that is sent out by the customer's solar electric system onto the utility grid. Net metering can be done using any electric rate provided for which the customer is eligible (including time of day rates).

Other Incentives

Renewable Energy Credits (RECS)

In some states markets are buying and selling Renewable Energy Credits (RECs) also known as green tags. The RECs represent the clean energy attributes of renewable electric systems (not the kilowatt hours). It is likely that during the life of a large commercial solar electric system the owner will be able to sell RECs in Wisconsin for additional income.

Note, that We Energies' solar electric buy back rate and solar energy development programs take ownership of the RECs from any solar electric systems they support.

SYSTEM ECONOMICS

System Cost

The typical installed price of a grid-tied solar system is \$8.00 to \$11.00 per watt. This means that an 8.0 kW system would cost anywhere from \$64,000 to \$88,000 before incentives. Larger systems (4.0 kW+) will tend to be toward the lower end of the range; smaller systems usually cost more \$/watt because the cost of additional modules is not as big a factor compared with the labor and materials that go into the initial installation of the PV system. Longer trenching distances will also increase the cost.

Tax implications and incentive interactions are complex and customer specific, you are strongly encouraged to use a financial professional to determine the economic and tax benefits of installing a solar electric system.

Assumptions used in calculations:

Key Assumptions	
Cost of System Per kW (dc)	\$9,000
Electricity rate year one (\$/kWh)	\$0.11
Estimated electricity price inflation rate (%/yr)	7.00%
Expected output degradation (%/year)	0.50%
Discount rate (used only in NPV)	2.9%

Rough estimates of system cost, output, financial incentives and simple payback period are shown in the table below: (A 28 kW system was used in the model in order to maximize the WE Energies non-profit grant. A larger system could be installed based on area of roof, but would not be the best financial decision based on lack of grant money available for systems over 28 kW. A smaller system could be installed as well and would produce very similar IRR and cost recovery numbers to the example below).

Energy Production, Cost, Economics and Environment	
Production	
Solar electric systems rated module capacity (kW dc)	28.00
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Cost	
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Focus Incentive	\$50,000
WE Grant and Expected Production Buydown	\$125,211
System cost after first cost incentives	\$76,790
System Cost after all incentives	\$76,790
Value of year 1 to year 10 power production	\$49,361
Economics	
10 year discounted NPV	-\$42,393
25 Year discounted NPV	\$44,402
10 Year IRR	-8.9%
25 Year IRR	6.4%
Years to cost recovery	15.0
Environment	
CO2 emission reduction per year (tons/year)	37.2

Based on the amount of shading and grant money, the payback period for this system is approximately 15 years.

OPERATION & MAINTENANCE

Operation and maintenance needs will be minimal with a fixed mounted systems. Expect to replace the inverter once in the system's first ten years (current cost about \$300/kW).

SUMMARY

The swimming pool roof of this school is an ideal location to mount a solar electric system. The roof is large with no obstructions and very minimal shading. The roof system itself is also fairly new and should last for another 15-25 years.

I recommend, if finances allow, a 20-28 kW solar electric system be installed on this roof.

GLOSSARY

Solar Electric System Definitions

Based largely on the Solar Electric Glossary from Sandia National Labs

Alternating Current (ac) An electric current that reverses direction periodically.

Direct Current (dc) Electric current flowing in only one direction.

Fixed Tilt Array A solar electric array set in at a fixed angle with respect to horizontal.

Grid Term used to describe an electrical utility distribution network.

Inverter In a solar electric system, an inverter converts dc power from the solar electric array to ac power compatible with the utility and ac loads.

Kilowatt (kW) One thousand watts. A unit of power.

Kilowatt Hour (kWh) One thousand watt-hours. A unit of energy. Power multiplied by time equals energy.

Module The smallest replaceable unit in a solar electric array. An integral, encapsulated unit containing a number of PV cells.

Net Energy Billing a billing and metering practice under which a customer is billed on the basis of net energy over the billing period taking into account accumulated unused kilowatt-hour credits from the previous billing period.

Orientation Placement with respect to the cardinal directions, N, S, E, W; azimuth is the measure of orientation from north.

Panel A designation for a number of solar electric modules assembled in a single mechanical frame.

Peak Load The maximum load demand on a system.

Photovoltaic Cell The treated semiconductor material that converts solar irradiance to electricity.

Photovoltaic System (or Solar Electric System) An installation of solar electric modules and other components designed to produce power from sunlight and meet the power demand for a designated load.

Power (Watts) A basic unit of electricity equal (in dc circuits) to the product of current and voltage.

Tilt Angle The angle of inclination of a solar collector measured from the horizontal.

Tracking Array A solar electric array that follows the path of the sun. This can mean one-axis, east to west daily tracking, or two-axis tracking where the array follows the sun in azimuth and elevation.

Watt (W) The unit of electrical power. The power developed when a current of one ampere flows through a potential difference of one volt; 1/746 of a horsepower.

Watt Hour (Wh) A unit of energy equal to one watt of power connected

REMARKS

This report was created to the best of my knowledge and with information that is currently available to me. Thank you for the opportunity to be of service to you. Please feel free to contact me with any questions or concerns.

Sincerely,


Ryan Lettau, E.I.T.

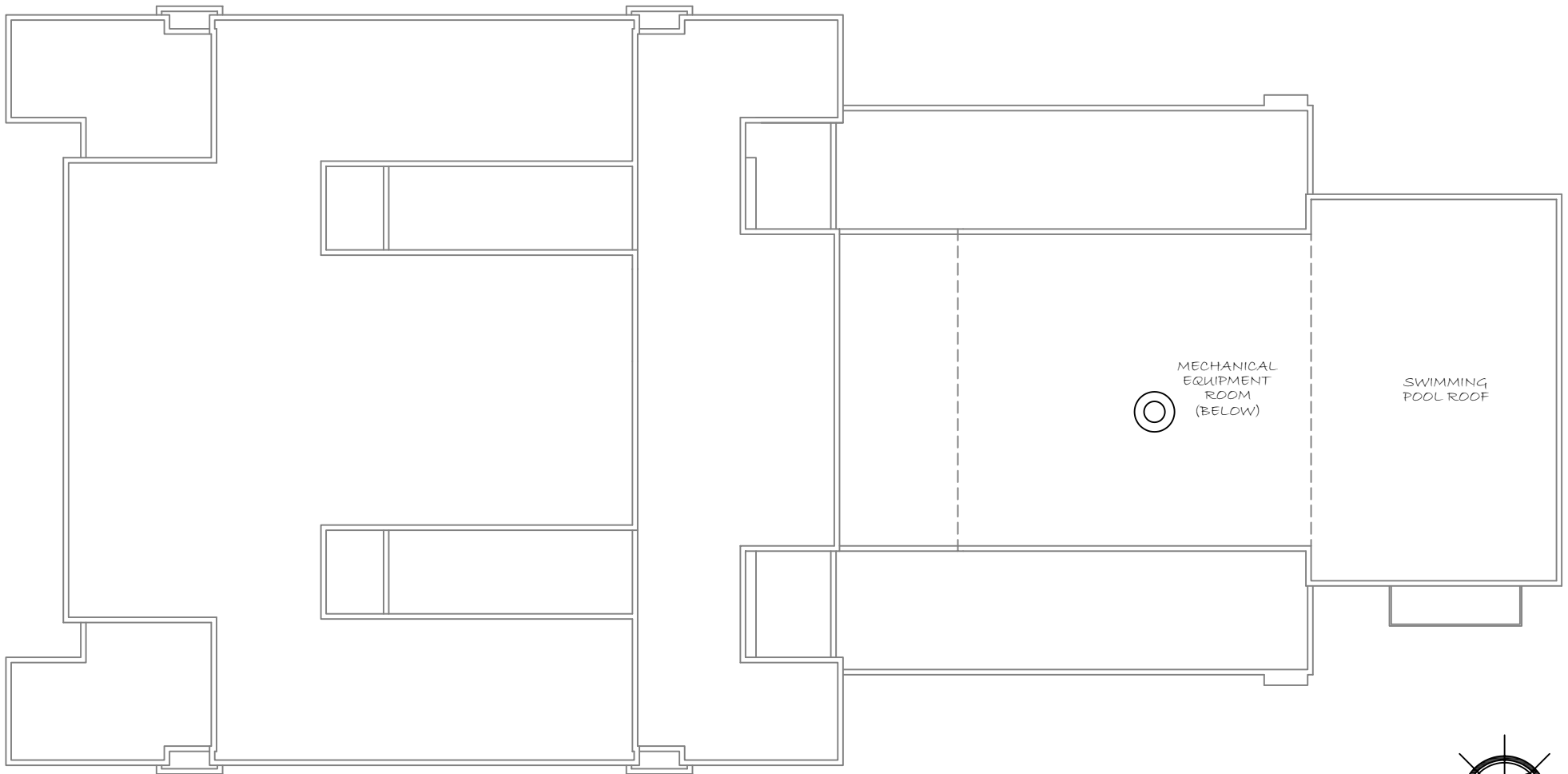
Velcheck & Finger Roof Consulting & Service

APPENDIX

Drawing #	Drawing Title
R-100	Overall Roof Plan
R-101	Swimming Pool Roof Plan
R-102	Pool Roof Solar Option 1 (32 kW)
R-103	Pool Roof Solar Option 2: (35 kW)



 <p>VELCHECK & FINGER ROOF CONSULTING & SERVICE</p> <p>VELCHECK & FINGER Roof Consulting & Service W231 N2844 Roundy Circle East Pewaukee, Wisconsin 53072 Telephone: 262.522.3690 Fax: 262.522.3691</p>	<p>Juneau High School 6415 W. Mount Vernon Ave. Milwaukee, WI</p>	Drawing Index		
		Job Number	64-6551	R-000
		Date	5/11/2009	
		Drawn by	Lettau	
	City of Milwaukee	Sheet Number	1 of 1	Scale:



VELCHECK & FINGER
 Roof Consulting & Service
 W231 N2844 Roundy Circle East
 Pewaukee, Wisconsin 53072
 Telephone: 262.522.3690
 Fax: 262.522.3691

Juneau High School
 6415 W. Mount Vernon Ave.
 Milwaukee, WI

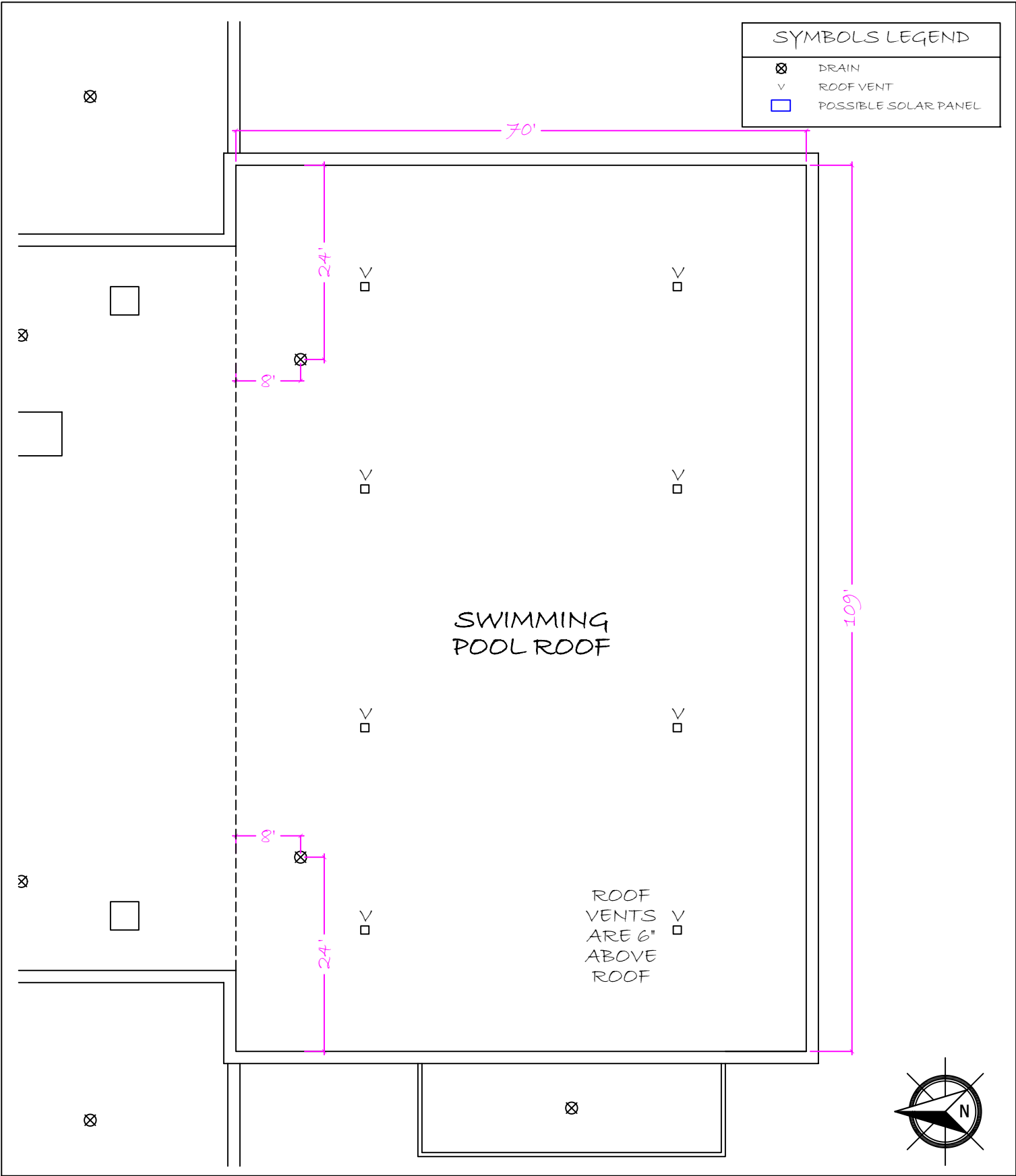
City of Milwaukee


Roof Plan

Job Number	64-6551
Date	5/11/2009
Drawn by	Lettau
Sheet Number	1 of 1

R-100

Scale: NTS



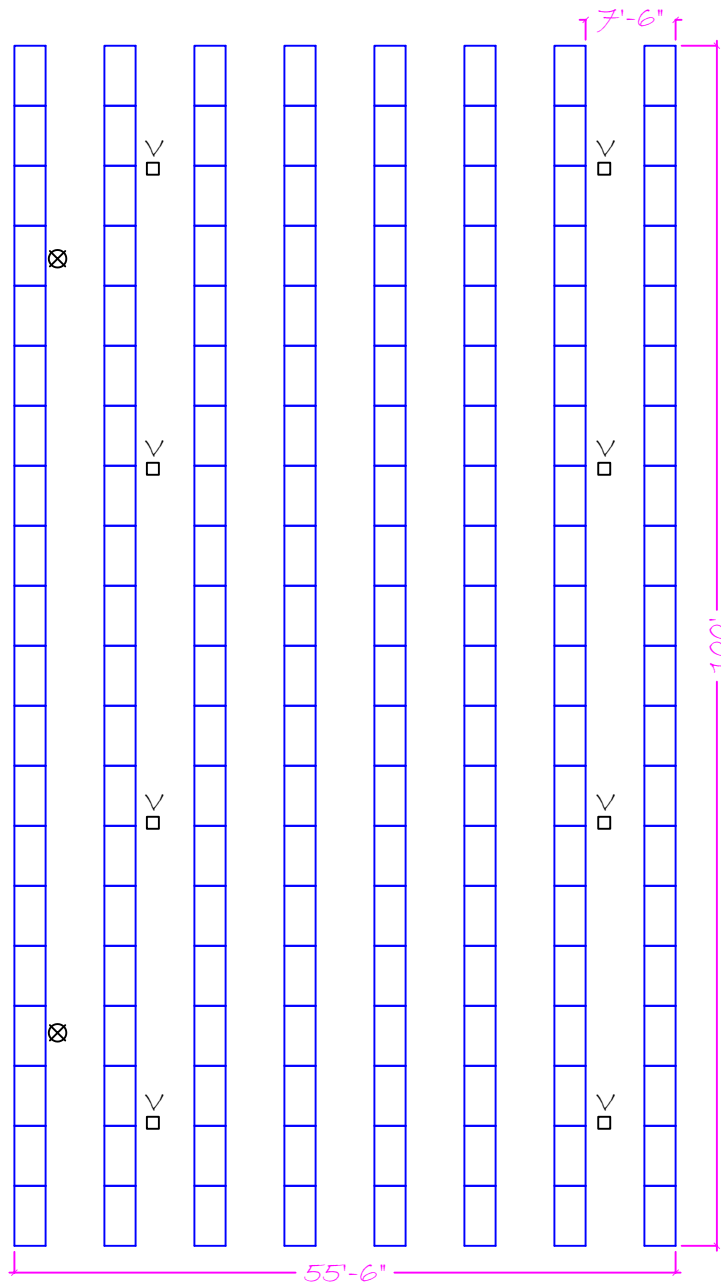
 VELCHECK & FINGER ROOF CONSULTING & SERVICE	VELCHECK & FINGER Roof Consulting & Service W231 N2844 Roundy Circle East Pewaukee, Wisconsin 53072 Telephone: 262.522.3690 Fax: 262.522.3691			Roof Plan: Pool Roof		
		Juneau High School 6415 W. Mount Vernon Ave. Milwaukee, WI		Job Number	64-6551	R-101
				Date	5/11/2009	
				Drawn by	Lettau	
		City of Milwaukee		Sheet Number	1 of 1	Scale:

SYMBOLS LEGEND

- ⊗ DRAIN
- ∨ ROOF VENT
- POSSIBLE SOLAR PANEL

32 KW SYSTEM

MECHANICAL ROOM BELOW
TO HOST
BALANCE OF
SYSTEM



VELCHECK & FINGER
Roof Consulting & Service
W231 N2844 Roundy Circle East
Pewaukee, Wisconsin 53072
Telephone: 262.522.3690
Fax: 262.522.3691

Juneau High School
6415 W. Mount Vernon Ave.
Milwaukee, WI

City of Milwaukee

Pool Roof Solar Option 1

Job Number 64-6551

Date 5/11/2009

Drawn by Lettau

Sheet Number 1 of 1

R-102

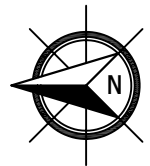
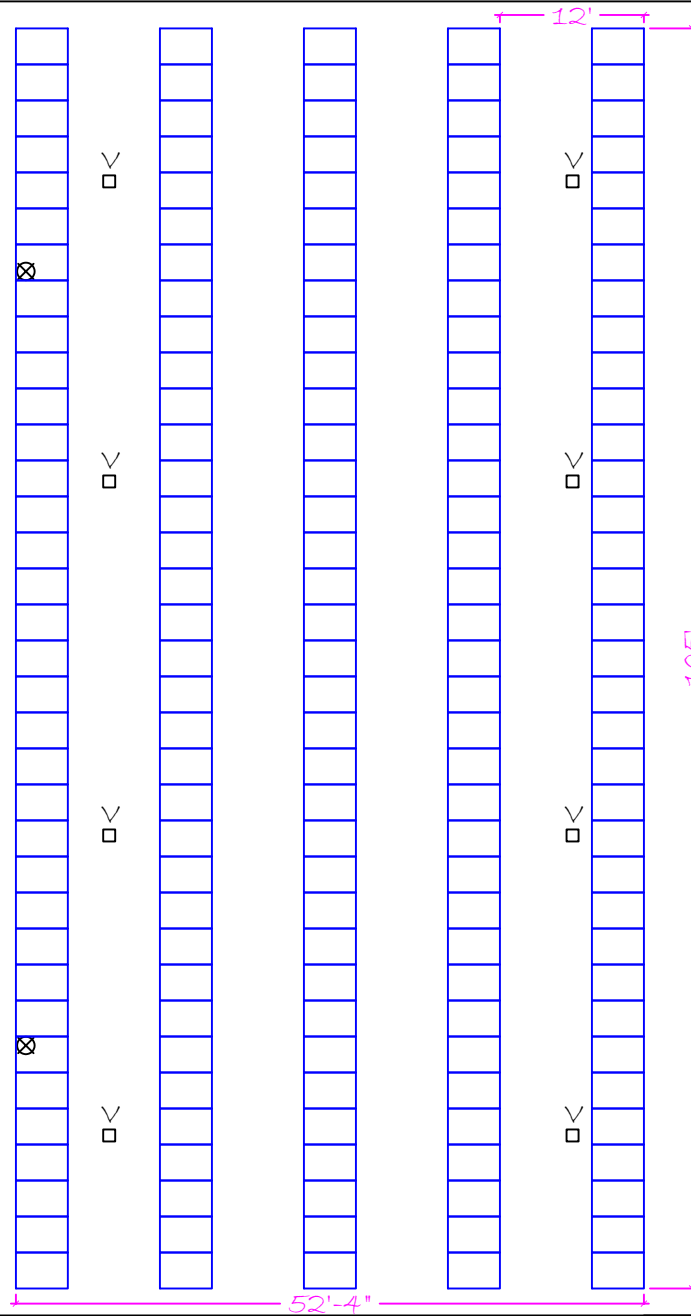
Scale: NTS

SYMBOLS LEGEND

- ⊗ DRAIN
- ∇ ROOF VENT
- POSSIBLE SOLAR PANEL

35 KW SYSTEM

MECHANICAL ROOM BELOW
TO HOST
BALANCE OF
SYSTEM



VELCHECK & FINGER
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W231 N2844 Roundy Circle East
Pewaukee, Wisconsin 53072
Telephone: 262.522.3690
Fax: 262.522.3691

Juneau High School
6415 W. Mount Vernon Ave.
Milwaukee, WI

City of Milwaukee

Pool Roof Solar Option 2

Job Number	64-6551
Date	5/11/2009
Drawn by	Lettau
Sheet Number	1 of 1

R-103

Scale: NTS

Full Service Solar Electric System Installation Firms Active in Wisconsin

This alphabetical listing of solar electric system installation firms will help you quickly find an installer. To qualify for a Solar Electric Cash-Back Reward or Implementation Grant, you must choose an installation firm on this list or one that has met the requirements of the Solar Electric Full Service Installer Policy found at focusonenergy.com. Appearing on this list does not imply recommendation or endorsement by Focus on Energy.

A **Full Service Installation Firm** is defined as the single point of contact with a customer to design, sell, install and maintain (service and/or repair) renewable energy equipment or who contracts with subcontractors to supply these services. A Full Service Installation Firm must employ a Focus on Energy approved **Full Service Installer (FSI)** who takes the responsible installation role on systems co-funded by Focus on Energy.

NABCEP Certified PV Installers:

The North American Board of Certified Energy Practitioners (NABCEP) has developed national credentialing and certification for PV professionals. A NABCEP Certified PV Installer has achieved this status by meeting a general set of knowledge, skills and abilities typically required of practitioners who install and maintain PV systems.

Arch Electric

W4499 Sumac Road
Plymouth, WI 53073
Phone: 920-893-8388
archelectric@excel.net
www.archelectricllc.com
FSI: Edward C Zinthefer
Service Territory: 100 miles

Carr Creek Electric Service LLC

314 East Maple St
Woodville, WI 54028
Phone: 715.698.4350
jarosch@baldwin-telecom.net
www.carrcreekelectricservice.com
FSI: Christopher Jarosch
Service Territory: Statewide

Driftless Solar

5200 County Road Z
Spring Green, WI 53588
Phone: 608-935-3670
mdearing@driftless.com
FSI: Mike Dearing
Service Territory: Statewide

Eland Electric

3154 Holmgren Way
Green Bay, WI 54304
Phone: 920.338.6000
electrical@elandelectric.com
www.elandelectric.com
FSI: Michael (Rick) Eland
Service Territory: 50 miles

Energyze, LLC

P.O. Box 395
Winneconne, WI 54986
Phone: 920.203.9555
jim.funk@goenergize.com
FSI: Jim Funk
Service Territory: Statewide

Energy Concepts

2349 Willis Miller Dr.
Hudson, WI 54016
Phone: 715.381.9977
ctarr@energyconcepts.us
www.energyconcepts.us
FSI: Craig Tarr, PE
Service Territory: 100 miles

Full Spectrum Solar

100 S. Baldwin St., Ste. 109
Madison, WI 53703
Phone: 608.284.9495 or
Toll free: 866.594.0580
info@fullspectrumssolar.com
www.fullspectrumssolar.com
FSI: Burke O'Neil
Service Territory: 150 miles

Go Solar

718 Mechanic St.
Decorah, IA 52101
Phone: 563.382.3242
gosolardp@gmail.com
www.gosolardp.com
FSI: Dennis Pottratz
Service territory: 150 miles

Great Northern Solar

77450 Evergreen Rd., Suite 1
Port Wing, WI 54865
Phone: 715.774.3374
gosolar@cheqnet.net
FSI: Christopher LaForge
Service Territory: Statewide

H & H Solar Energy Services

2801 Syene Road
Madison, WI 53713
Phone: 608.268.5923 or
608.268.5922
abangert@hhelectric.com
www.h-hgroup.com
FSI: Andrew Bangert
Service Territory: 150 miles

Habi-Tek

524 Summit St
Geneva, IL 60134
Phone: 630.262.8193
Fax: 630.262.1343
habitek83@yahoo.com
FSI: Tom Debates
Service Territory: Statewide

Innovative Power Systems Inc.

1153 16th Ave., SE
Minneapolis, MN 55414
Phone: 612.623.3246
www.ips-solar.com
FSI: Ralph Jacobson
Service Territory: 125 miles

Johnson Controls Inc.

N22 W22922 Nancy's Ct.
Waukesha, WI 53186
Phone: 262.970.5888
Fax: 262.549.8481
walt.novash@jci.com
FSI: Walt Novash
Service Territory: Statewide,
Commercial/ Industrial/
Institutional only

Lake Michigan Wind & Sun

1015 County Road U
Sturgeon Bay, WI 54235
Phone: 920.743.0456
info@windandsun.com
www.windandsun.com
FSI: John Hippensteel
Service Territory: Statewide

M8 Electric Solutions LLC

3152 Sussex St.
River Falls, WI 54022
Phone: 612.490.9443
m.harvey@m8electric.com
www.m8electric.com
FSI: Michael Harvey
Service Territory: Statewide

North Wind Renewable Energy, LLC

PO Box 723
Stevens Point, WI 54481
Phone: 715.252.1919
info@northwindre.com
www.northwindre.com
FSI: Craig Buttké
Service Territory: 60 miles

Photovoltaic Systems LLC

7910 Hwy 54
Amherst, WI 54406
Phone: 715.824.2069
pvsolar@wi-net.com
www.pv-systems.org
FSI: James Kerbel
Service Territory: Statewide

SOLutions

P.O. Box 309
Cornucopia, WI 54827
Phone: 715.742.3406
info@sunwiseanswers.com
www.sunwiseanswers.com
FSI: Kurt Nelson
Service Territory: Statewide

Wisconsin Power Control

238 E. Main St. Ste A
Marshall, WI 53599
Phone: 608.575.4296
steve@wipowercontrol.com
www.wipowercontrol.com
FSI: Steve Tweed
Service Territory: Statewide

Installers Working Toward NABCEP Certification:

Albright Electric & Solar LLC

8109 N Robert Dr.
Evansville, WI 53536
Phone: 608.882.4510
muddy@charter.net
www.albrightelectricandsolar.com
FSI: Doug Albright
Service Territory: Statewide

Conservation Technologies

4804 Oneota St
Duluth, MN 55807
Phone: 218.722.9003 ext 20
info@conservationtech.com
FSI: Scott McTavish
Service Territory: Northern WI

Legacy Solar

864 Clam Falls Trail
Frederic, WI 54837
Phone: 715.653.4295
solman@legacysolar.com
www.legacysolar.com
FSI: Kris Schmid
Service Territory: Statewide

Let it Shine Energy Services LLC

803 W 3rd St.
Washburn, WI 54891
Phone: 715.373.0977
jpjohanning@yahoo.com
FSI: John Johanning
Service Territory: Northern WI

Milwaukee Solar

270 N. Elm Grove Rd.
Brookfield WI 53005-6246
Phone: 262.782.4042
dgwolff@att.net
FSI: Dean Wolff
Service Territory: 120 miles

New Solar, LLC

N6002 Moore Rd.
Seymour, WI 54165
Phone: 920.833.7840
new.solar@yahoo.com
FSI: Mike Troge
Service Territory: Statewide

Next Step Energy Systems, LLC

1319 Altoona Ave.
Eau Claire, WI 54701-4278
Phone: 715.830.9337
zeus@nextstepenergy.com
FSI: Zeus Stark
Service Territory: 100 miles

Pieper Electric

7801 W Plainsview Ave.
Franklin, WI 53132
Phone: 414.303.1150
preinp@pieperpower.com
FSI: Patrick Prening
Service Territory: SW and Central WI

Power Control, LLC

19250 W. College Ave.
New Berlin, WI 53146
Phone: 414.688.6196
powercontrol1@netzero.com
FSI: Dom Santilli
Service Territory: 100 miles

Prairie Solar Power & Light

110 Coffin St.
Eastman, WI 54626
Cell: 608.412.0132
bannen01@centurytel.net
FSI: Rich Bannen
Service Territory: 150 miles

Simply Solar

1851 Scarlet Oak Trl.
Oshkosh, WI 54904
Phone: 920.426.1926
simplysolar@sbcglobal.net
FSI: Doug Keator
Service Territory: Statewide

SUN & daughters

4321 Walters Lake Rd.
Sugar Camp, WI 54501
Phone: 715.272.1700
markyeager@frontiernet.net
FSI: Mark Yeager
Service Territory: Northern WI

Timmerman's Talents

5381 Beagle Lane
Platteville, WI 53818
Phone: 608.642.2262
timmer@mhtc.net
FSI: Todd Timmerman
Service Territory: Statewide

Town & Country Electric

800 Wilburn Rd
Sun Prairie, WI 53590
Phone: 608.834.2683
theo.scholze@faith-technologies.com
FSI: Theo Scholze
Service Territory: Statewide

When Selecting an Installer

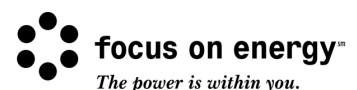
Focus on Energy recommends that you solicit bids and interview at least three potential contractors. Questions that you may ask include:

- Can you provide references from previous customers with similar systems?
- When would you be able to perform the work?
- How long will the project take?
- Do you provide a performance guarantee and/or warranty, and if so, what are the details?
- How many similar systems have you installed?
- Have you worked with local building officials and utility representatives when installing similar systems in the past?
- Do you have a master electrician (or professional electrical engineer) as part of the project team?
- Will you hire subcontractors to complete portions of the project? What firms will you hire and what will they do?
- Do you repair systems that you installed, and if so, what are your rates?
- What kind of training will you provide me with so that I can better operate and maintain my system?

Get on the Full Service Installer List or Update Your Listing

We encourage full service renewable energy firms doing business in Wisconsin to be included in the Full Service Installation Firm list. To request to be included in this listing or to update or correct information provided contact Emily Hickey at 608.441.3840 x320 or emilyh@weccusa.org.

Focus on Energy works with eligible Wisconsin residents and businesses to install cost effective energy efficiency and renewable energy projects. Focus information, resources and financial incentives help to implement projects that otherwise would not get completed, or to complete projects sooner than scheduled. Its efforts help Wisconsin residents and businesses manage rising energy costs, promote in-state economic development, protect our environment and control the state's growing demand for electricity and natural gas. For more information call **800.762.7077** or visit **focusonenergy.com**.



Focus on Energy
Site Evaluation Form

Customer Name: Juneau High School

Site Address: 6415 W. Mount Vernon Ave

Assessor Name: Ryan Lettau

Please rate the site for each technology included in the completed site assessment. This form needs to be attached to all completed assessment in order to be processed for a Focus on Energy incentive.

Solar Electric (PV)

☐ Excellent (site has an unshaded space suitable for installation of solar system sized to meet customers stated goals, appropriate and available location for balance of systems)

☐ Good (site has some minimal shading (less than 8%), or will require some modifications to accommodate equipment)

☐ Fair site (site has some shading (less than 25%), and/or will require significant modifications to accommodate equipment)

☐ Poor/Not Advisable (site has very limited solar window or other physical characteristics that make it unsuitable for the installation of a solar electric system)

Solar Water Heating

☐ Excellent (site has an unshaded space suitable for installation of solar system sized to meet customers stated goals, appropriate and available location for balance of systems)

☐ Good (site has some minimal shading (less than 10% from 10 a.m. to 2 p.m.), or will require some modifications to accommodate equipment)

☐ Fair site (site has some shading (less than 25%), and/or will require significant modifications to accommodate equipment)

☐ Poor/Not Advisable (site has very limited solar window or other physical characteristics that make it unsuitable for the installation of a solar electric system)

Wind

Wind speed at site: _____ mph at minimum acceptable tower height for the site: _____ feet

☐ Suitable (site has unobstructed space and setbacks suitable for the installation of wind system sized to meet customers stated goals. Estimated wind speed at site is better than average for good turbine performance)

☐ Marginal (site has some obstructions that will need to be overcome by increased tower height; or there are potential setback restrictions. Estimated wind speed at site is adequate for acceptable turbine output)

☐ Not advised (site has serious obstructions that will be difficult to overcome with increased tower height; or the site cannot meet setback restrictions. Estimated wind speed is below average which will result in poor turbine performance. Site is unsuitable for a wind turbine)